



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/516,708

12/03/2004

Takuo Funaya

Q85154

6730

23373 7590 09/04/2008
SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER

STONER, KILEY SHAWN

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

09/04/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/516,708	Applicant(s) FUNAYA ET AL.	
	Examiner KILEY STONER	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 April 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-13 and 15-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9-13 and 15-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 9-13, 15-20 and 33-34 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Blair et al. (U.S. 6,109,506).

Blair et al. teach a solder comprising zinc at 7 to 10 weight % both inclusive, bismuth at 1 to 6 weight % both inclusive, silver at X weight % wherein X is equal to or greater than 0.025, but smaller than 0.1, and the remainder of tin, said solder being lead-free (column 2, line 61-column 3, line 10; Tables 1 and 2; and claims 7, 8, 11 and 12); said solder is in the form of powder (column 2, line 52). The composition of Blair et

Art Unit: 1793

al. would intrinsically have the claimed composition when melted. Blair et al. also teach that the solder comprises said silver at 0.025 to .08 weight % both inclusive (column 2, line 61-column 3, line 10; Tables 1 and 2; and claims 7, 8, 11 and 12), and said solder contains said silver at Z weight % ($0.025 \leq Z < 0.1$) (column 2, line 61-column 3, line 10; Tables 1 and 2; and claims 7, 8, 11 and 12).

With respect to claims 11-12 and 17-18, Blair et al. does not teach the diameter of the solder paste particles; however, the examiner take Official Notice that the claimed diameters are well known in the art.

With respect to claims 13, 19 and 20, Blair et al. teach that the solder is mixed with flux, but is silent with respect to the concentration of flux. It is the examiner's position that the amount of flux is a result effective variable that would be readily optimized to obtain an adequate bond. Thus, the claimed concentration of flux would have been obvious to one of ordinary skill in the art.

Claims 9-13 and 15-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shoji et al. (US 2006/0071051 A1).

Shoji et al. teach an electronic component soldered to a board (paragraph 3) by soldering with a Pb free solder comprising up to 9% Zn, at least 0.05% Bi (paragraphs 13-16) and a combined impurity level of Ag among other elements of less than 1% in a balance of Sn (paragraph 34). Powder diameter is 1 to 20 microns (paragraphs 42 and 43). Solder is mixed with 8-14% flux (paragraph 24). However, the particular concentration of Ag is not disclosed. Even through Shoji et al. teach that the presence

Art Unit: 1793

of Ag under 1 mass % does not adversely affect the characteristics of the solder metal, it is the examiner's position that one of ordinary skill in the art would be motivated to reduce the level of Ag impurity in order to form a pure solder alloy. A solder alloy with a lower concentration of impurities will more readily wet the materials being bonded. In addition, a high level of impurities could alter the melting temperature of the solder alloy. Thus, it would be desirable to one of ordinary skill in the art to form a solder alloy with a concentration of Ag within the claimed range of 0.025 to 0.1 weight %; 0.025 to 0.08 weight %; and silver at Z weight % ($0.025 \leq Z < 0.1$).

Response to Arguments

Applicant's arguments filed 4/18/08 have been fully considered but they are not persuasive. The applicant argues that:

"Blair's ranges may overlap or touch the presently claimed ranges, Blair's ranges are so broad that they fail to disclose the claimed ranges with sufficient specificity to constitute an anticipation under 102. Thus, Applicant respectfully submits that Blair fails to anticipate the present claims."

The examiner respectfully disagrees. The MPEP states that:

"When the prior art discloses a range which touches or overlaps the claimed range, but no specific examples falling within the claimed range are disclosed, a case by case determination must be made as to anticipation. In order to anticipate the claims, the claimed subject matter must be disclosed in the reference with "sufficient specificity to constitute an anticipation under the statute." What constitutes a "sufficient specificity" is fact dependent. If the claims are directed to a narrow range, and the reference teaches a broad range, depending on the other facts of the case, it may be reasonable to conclude that the narrow range is not disclosed with "sufficient specificity" to constitute an anticipation of the claims. See, e.g., *Atofina v. Great Lakes Chem. Corp.*, 441 F.3d 991, 999, 78 USPQ2d 1417, 1423 (Fed. Cir. 2006) wherein the court held

Art Unit: 1793

that a reference temperature range of 100-500 degrees C did not describe the claimed range of 330-450 degrees C with sufficient specificity to be anticipatory. Further, while there was a slight overlap between the reference's preferred range (150-350 degrees C) and the claimed range, that overlap was not sufficient for anticipation. "[T]he disclosure of a range is no more a disclosure of the end points of the range than it is each of the intermediate points." *Id.* at 1000, 78 USPQ2d at 1424. Any evidence of unexpected results within the narrow range may also render the claims unobvious. The question of "sufficient specificity" is similar to that of "clearly envisaging" a species from a generic teaching. See MPEP § 2131.02. A 35 U.S.C. 102 /103 combination rejection is permitted if it is unclear if the reference teaches the range with "sufficient specificity." The examiner must, in this case, provide reasons for anticipation as well as a reasoned statement regarding obviousness. *Ex parte Lee*, 31 USPQ2d 1105 (Bd. Pat. App. & Inter. 1993) (expanded Board). For a discussion of the obviousness of ranges see MPEP § 2144.05." (emphasis added by the examiner).

In the instant case, the examiner considers Example 1 of Blair to be specific examples within the claimed range. Thus, the examiner maintains that the compositions disclosed by Blair constitute "sufficient specificity" and anticipate the claims. Furthermore, in Example 1 the teaching of 1-40 wt% Zn encompasses the claimed range of 7-10 wt% Zn, the teaching of 0-2.0 wt% Bi overlaps the claimed range of 1-6 wt% Bi, and the teaching of 0-3.5 wt% Ag encompasses the claimed range of 0.025-0.1 wt% Sn. Accordingly, it is the examiner's position that the teachings of Blair reasonably anticipate the claimed range with sufficient specificity. The Takuo Funaya Declaration does not overcome the anticipatory rejection.

In addition, the examiner maintains that the Takuo Funaya Declaration is not completely commensurate in scope with the claimed composition. For example, the declaration does not establish unexpected results for the entire claimed range of 7-10 wt% Zn and 1-6 wt% Bi. Thus, the Declaration is not persuasive.

As stated above in the obviousness rejection over Shoji, “Even through Shoji et al. teach that the presence of Ag under 1 mass % does not adversely affect the characteristics of the solder metal, it is the examiner’s position that one of ordinary skill in the art would be motivated to reduce the level of Ag impurity in order to form a pure solder alloy. A solder alloy with a lower concentration of impurities will more readily wet the materials being bonded. In addition, a high level of impurities could alter the melting temperature of the solder alloy.” The applicant has failed to provide an argument or respond to the examiner’s motivation for reducing the amount of Ag impurity. Accordingly, the examiner maintains the position that it would have been obvious to reduce the amount of Ag to within the claimed range.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 1793

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kiley Stoner whose telephone number is 571-272-1183. The examiner can normally be reached Monday-Thursday (9:30 a.m. to 8:00 p.m.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on 571-272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kiley Stoner/

Primary Examiner, Art Unit 1793